Notes for Pathology Part II Immunology option, 7th October 2015

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Introduction to innate immunity

The innate immune system senses and responds to pathogens and the disruption of homeostasis. By virtue of its evolution, innate immunity is complex and involves an enormous breadth of components that can broadly be divided into cellular, cell intrinsic and extracellular mechanisms. It differs from adaptive immunity by virtue of not having to make permanent genetic alterations in order to respond (although an exact definition of 'innate immunity' is tricky).

Cells of the innate immune system include but are not limited to macrophages, innate lymphoid cells, natural killer cells and dendritic cells, all of which can sense and respond to infection or tissue damage without genome rearrangements.

At the molecular level, pattern recognition receptors on all cells can sense and respond to infection by initiating cytokine, chemokine and interferon transcription. These mediators cause up-regulation of cell intrinsic defences and recruitment of heamatopoietic cells – both innate and adaptive cellular components. In the extracellular environment, complement and other molecular defence mechanisms exists that can actively tackle pathogens before they gain entry into host cells.

The complexity of innate immunity is driven by host/pathogen interactions. All organisms have innate responses and all pathogens have counter-defence mechanisms. Co-evolution results in a balance between the two systems that allows existence of all life on earth. That balance is most seriously disrupted when pathogens jump between species or evolve novel virulence factors.

This lecture will introduce some of the concepts that will be built upon by further lectures in the series. **References are on the slides and/or will come from further lectures.**

Subjects that may not be covered further in the course are described in the following reviews:

Pluddemann et al 2011 Immunol Rev 240: 11

Martin-Serrano and Neil 2011 Nat Rev Microbiol 9: 519

Stern and Sorek 2010 Bioessays 33: 43

Sorek et al 2008 Nat Rev Microbiol 6: 181